Technical Publications

Direction 2089507

Centricity Universal Viewer Zero Footprint (ZFP) DICOM CONFORMANCE STATEMENT

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REVISION HISTORY

Revision	Date	Description
1	7-May-2015	Initial version for Centricity Universal Viewer Zero Footprint v6.0.
2	16-June-2015	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP1. Added SOPs for Multi-Frame Grayscale Byte SC Image, Multi-Frame True Color SC Image, NM Image (Retired) and RT image.
3	29-June-2015	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP1. Updated all existing SOP Classes and SOP Class UIDs
4	22-Mar-2016	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP3. Updated the SOP Class UID for Ultrasound Multi-frame Image Storage. Added Grayscale Softcopy Presentation State Storage SOP Class.
5	02-March-2017	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP6. Updated document to indicate that ZFP now supports GE HealthCloud Object Store deployments. Added application data flow diagrams (sections 2.2.1-2.2.3). Added addition information for sequencing of real-works activities (section 2.2.3.1 and 2.2.3.2). Added window/level computation and pixel spacing handling information (section 2.3). Indicated that ZFP supports other languages in addition to English (section 2.4).
6	09-February-2019	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP10. 12-Lead ECG Waveform Storage (for GE Only) (Section 2.3.3)
7	17-April-2019	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP10.2 Audit trail messaging in relation to ATNA implementation.
8	29-Sep-2020	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP11.3 Updated Table 0.1 and 2.1 – Displayable SOP classes Updated section 2.4 to include UTF8 for Dicom Webservices Updated section 2.5 with Photometric interpretation support Updated section 2.7 to include QIDO-RS specification

9	29-June-2021	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP11.4. Added a note at the end of Displayable SOP Classes “Limited capability to support display of Electrocardiogram”. Updated DICOM reference sections in Application Data Flow Diagram at section 2.2.1.1, 2.2.1.2 and 2.2.1.3 Updated status codes for DICOM WEB service at section 2.7.4 Updated details od WADO-RS and QIDO-RS sections. Updated section 2.8 and 2.8.12 for RAD-69 Retrieve Imaging Document Set.
10	8-Nov-2021	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP11.5. Updated Section 2.9 Audit Trail Messages. Added Table 2.13.2 for Outbound Launch. Update "NetworkAccessPointID" to "ZFP Server Node Machine Name / IPAddress" where ZFP is ActiveParticipant. Update "NetworkAccessPointID" to "ZFP Client Node IP Address" where User is ActiveParticipant. Added Table 2.13.3 for Ms-Teams study share.
11	09-Feb-2022	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP11.5. Added SOP class support for Enhanced SR, Comprehensive SR,Mammography CAD SR, Chest CAD SR, X-Ray Radiation Dose SR. Updated Audit trail section 2.9.1 – Application Activity - MediaType and NetworkAccessPointID is added only by Dicom Viewer. Update all Audit trail messages.
12	10-June-2022	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP11.x, SP10.x and SP9.x. Updated Section 2.3.2 for pixel spacing handling. Added Section 2.3.5 for high resolution images support Added Section 2.3.6 and Section 3 for Grayscale Softcopy Presentation State
13	27-June-2022	Updated version for Centricity Universal Viewer Zero Footprint v6.0-SP11.5 Specified that Table 3-20 under Section 3.3.5.12 is applicable from Centricity Universal Viewer Zero Footprint v6.0-SP11.5

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CONFORMANCE STATEMENT OVERVIEW

The Universal Viewer ZFP is a viewing application of DICOM objects that are stored on the Centricity Enterprise Archive or the Centricity PACS server. All of the networking, database, and other services are provided by the Centricity Enterprise Archive or the Centricity PACS server. This conformance claim refers to the conformance claim for the Centricity Enterprise Archive or the Centricity PACS server for all such services. The Universal Viewer ZFP accesses rendered DICOM Objects as a client user of WADO-URI service. Table 0.1 provides an overview of the DICOM objects can be displayed by ZFP.

Table 0.1 – Displayable SOP Classes

SOP Classes	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4

SOP Classes	SOP Class UID
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
NM Image (Retired)	1.2.840.10008.5.1.4.1.1.5
RT Image	1.2.840.10008.5.1.4.1.1.481.1
12-lead ECG Waveform Storage*	1.2.840.10008.5.1.4.1.1.9.1.1
Enhanced SR**	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR**	1.2.840.10008.5.1.4.1.1.88.33
Mammography CAD SR**	1.2.840.10008.5.1.4.1.1.88.50
Chest CAD SR**	1.2.840.10008.5.1.4.1.1.88.65
X-Ray Radiation Dose SR**	1.2.840.10008.5.1.4.1.1.88.67

* Limited capability to support display of Electrocardiogram. Refer section 2.3.3

**Basic display is supported.

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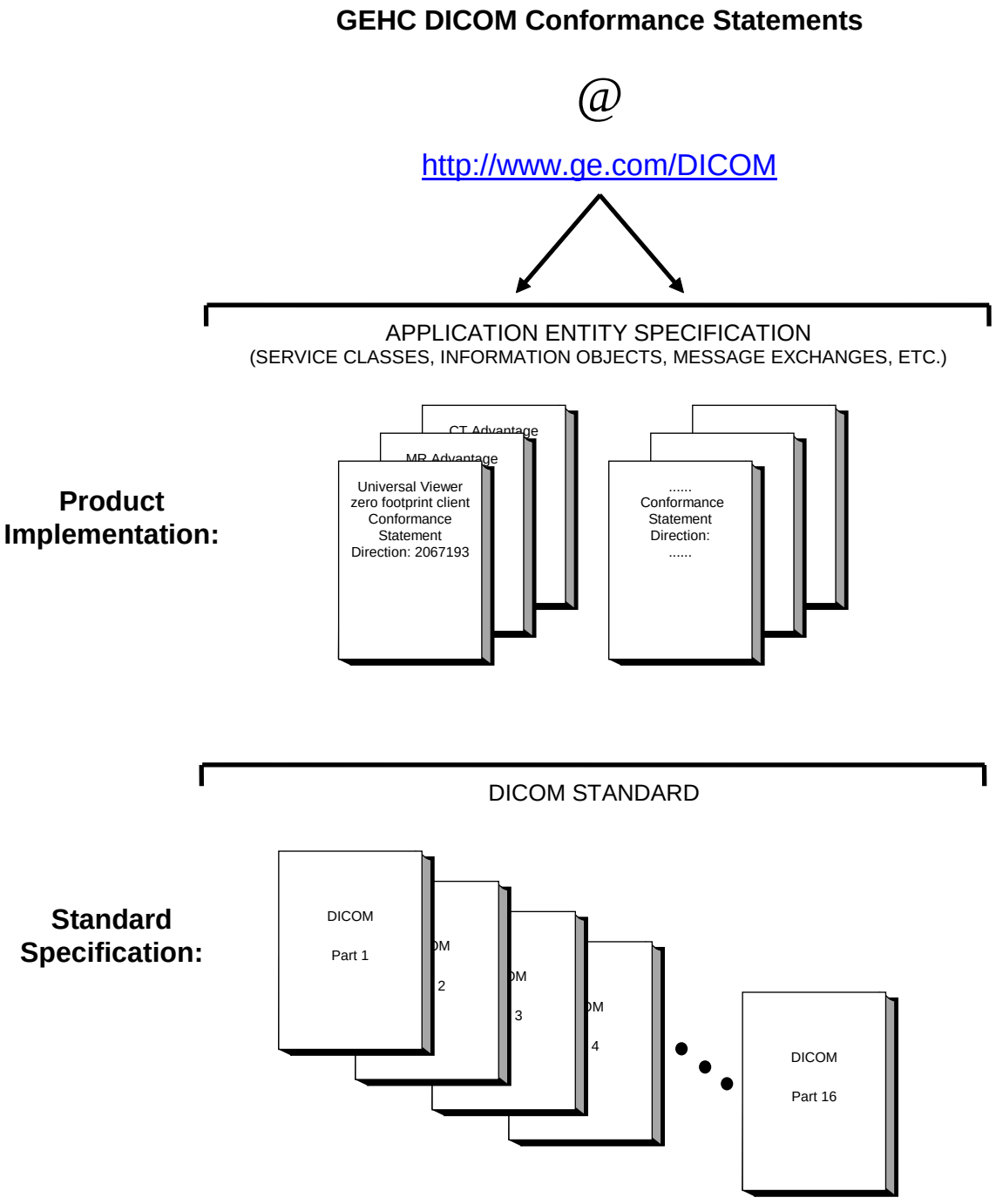
1. INTRODUCTION

1.1 OVERVIEW

This DICOM Conformance Statement is divided into Sections as described below:
Section 1 (Introduction), which describes the overall structure, intent, and references for this Conformance Statement
Section 2 (Network Conformance Statement), which specifies the GEHC equipment compliance to the DICOM requirements for the implementation of Networking features.
Section 3 (Grayscale Softcopy Presentation State Information Object), which specifies the compliance to the DICOM requirements of Grayscale Softcopy Presentation State features.

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEHC DICOM Conformance Statements is shown in the Illustration below.



This document specifies the DICOM implementation. It is entitled:

Universal Viewer ZFP

Conformance Statement for DICOM

*Direction **2089507***

This DICOM Conformance Statement documents the DICOM Conformance Statement and Technical Specification required to interoperate with the GEHC network interface.

The GEHC Conformance Statement, contained in this document, also specifies the Lower Layer communications which it supports (e.g., TCP/IP). However, the Technical Specifications are defined in the DICOM Part 8 standard.

For more information regarding DICOM, copies of the Standard may be obtained on the Internet at http://medical.nema.org. Comments on the Standard may be addressed to:

DICOM Secretariat
NEMA
1300 N. 17th Street, Suite 1752
Rosslyn, VA 22209
USA
Phone: +1.703.841.3200

1.3 INTENDED AUDIENCE

The reader of this document is concerned with software design and/or system integration issues. It is assumed that the reader of this document is familiar with the DICOM Standard and with the terminology and concepts which are used in that Standard.

1.4 SCOPE AND FIELD OF APPLICATION

It is the intent of this document to provide an unambiguous specification for GEHC implementations. This specification, called a Conformance Statement, includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GEHC medical data exchanged using DICOM. The GEHC Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GEHC devices are capable of using different Information Object Definitions. For example, a GEHC CT Scanner may send images using the CT Information Object, MR Information Object, Secondary Capture Object, etc.

Included in this DICOM Conformance Statement are the Module Definitions which define all data elements used by this GEHC implementation. If the user encounters unspecified private data elements while parsing a GEHC Data Set, the user is well advised to ignore those data elements (per the DICOM standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements which are sent by GEHC devices.

1.5 IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM Standards, is intended to facilitate communication with GE imaging equipment. However, **by itself, it is not sufficient to ensure that inter-operation will be successful**. The **user (or user's agent)** needs to proceed with caution and address at least four issues:

- **Integration** - The integration of any device into an overall system of interconnected devices goes beyond the scope of standards (DICOM v3.0), and of this introduction and associated DICOM Conformance Statements when interoperability with non-GE equipment is desired.

The responsibility to analyze the applications requirements and to design a solution that integrates GE imaging equipment with non–GE systems is the **user's** responsibility and should not be underestimated. The **user** is strongly advised to ensure that such an integration analysis is correctly performed.

- **Validation** - Testing the complete range of possible interactions between any GE device and non–GE devices, before the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non–GE provider accepts full responsibility for all validation required for their connection with GE devices. This includes the accuracy of the image data once it has crossed the interface between the GE imaging equipment and the non–GE device and the stability of the image data for the intended applications.

  Such a validation is required before any clinical use (diagnosis and/or treatment) is performed. It applies when images acquired on GE imaging equipment are processed/displayed on a non-GE device, as well as when images acquired on non-GE equipment is processed/displayed on a GE console or workstation.
- **Future Evolution** - GE understands that the DICOM Standard will evolve to meet the user's growing requirements. GE is actively involved in the development of the DICOM Standard. DICOM will incorporate new features and technologies and GE may follow the evolution of the Standard. The GEHC protocol is based on DICOM as specified in each DICOM Conformance Statement. Evolution of the Standard may require changes to devices which have implemented DICOM. **In addition, GE reserves the right to discontinue or make changes to the support of communications features (on its products) described by these DICOM Conformance Statements**. The **user** should ensure that any non–GE provider, which connects with GE devices, also plans for the future evolution of the DICOM Standard. Failure to do so will likely result in the loss of function and/or connectivity as the DICOM Standard changes and GE Products are enhanced to support these changes.
- **Interaction** - It is the sole responsibility of the **non–GE provider** to ensure that communication with the interfaced equipment does not cause degradation of GE imaging equipment performance and/or function.

1.6 REFERENCES

1. Digital Imaging and Communications in Medicine (DICOM) Standards, available free at http://medical.nema.org/

2. Centricity Enterprise Archive V4.0 DICOM CONFORMANCE STATEMENT, DOC0708777

3. Centricity PACS Version 4.0 DICOM CONFORMANCE STATEMENT, DOC1145900

1.7 DEFINITIONS

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.
Abstract Syntax – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE) – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.
Application Entity Title – the externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network.
Application Context – the specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.
Association – a network communication channel set up between *Application Entities*.
Attribute – a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).
Information Object Definition (IOD) – the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.
Joint Photographic Experts Group (JPEG) – a set of standardized image compression techniques, available for use by DICOM applications.
Media Application Profile – the specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs)
Module – a set of *Attributes* within an *Information Object Definition* that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.
Negotiation – first phase of *Association* establishment that allows *Application Entities* to agree on the types of data to be exchanged and how that data will be encoded.
Presentation Context – the set of DICOM network services used over an *Association*, as negotiated between *Application Entities*; includes *Abstract Syntaxes* and *Transfer Syntaxes*.
Protocol Data Unit (PDU) – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.
Security Profile – a set of mechanisms, such as encryption, user authentication, or digital signatures, used by an *Application Entity* to ensure confidentiality, integrity, and/or availability of exchanged DICOM data
Service Class Provider (SCP) – role of an *Application Entity* that provides a DICOM network service; typically, a server that performs operations requested by another *Application Entity* (*Service Class User*). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).
Service Class User (SCU) – role of an *Application Entity* that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)
Service/Object Pair (SOP) Class – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.
Service/Object Pair (SOP) Instance – an information object; a specific occurrence of information exchanged in a *SOP Class*. Examples: a specific x-ray image.

Tag – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax – the encoding used for exchange of DICOM information objects and messages. Examples: *JPEG* compressed (images), little endian explicit value representation.

Unique Identifier (UID) – a globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR) – the format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

1.8 SYMBOLS AND ABBREVIATIONS

AE	Application Entity
AET	Application Entity Title
CAD	Computer Aided Detection
CDA	Clinical Document Architecture
CD-R	Compact Disk Recordable
CSE	Customer Service Engineer
CR	Computed Radiography
CT	Computed Tomography
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DIT	Directory Information Tree (LDAP)
DN	Distinguished Name (LDAP)
DNS	Domain Name System
DX	Digital X-ray
ECG	Electrocardiogram
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
GSDF	Grayscale Standard Display Function
GSPS	Grayscale Softcopy Presentation State
HIS	Hospital Information System
HL7	Health Level 7 Standard
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISO	International Organization for Standards
IO	Intra-oral X-ray
JPEG	Joint Photographic Experts Group

LDAP	Lightweight Directory Access Protocol
LDIF	LDAP Data Interchange Format
LUT	Look-up Table
MAR	Medication Administration Record
MPEG	Moving Picture Experts Group
MG	Mammography (X-ray)
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance Imaging
MSPS	Modality Scheduled Procedure Step
MTU	Maximum Transmission Unit (IP)
MWL	Modality Worklist
NM	Nuclear Medicine
NTP	Network Time Protocol
O	Optional (Key Attribute)
OCT	Ophthalmic Tomography
OP	Ophthalmic Photography
OSI	Open Systems Interconnection
PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
PDF	Portable Document Format
PDU	Protocol Data Unit
R	Required (Key Attribute)
RDN	Relative Distinguished Name (LDAP)
RF	Radiofluoroscopy
RIS	Radiology Information System
RT	Radiotherapy
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
SPS	Scheduled Procedure Step
SR	Structured Reporting
TCP/IP	Transmission Control Protocol/Internet Protocol
U	Unique (Key Attribute)
UL	Upper Layer
US	Ultrasound
VL	Visible Light
VR	Value Representation
XA	X-ray Angiography

2. NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the Universal Viewer ZFP compliance to DICOM requirements for **Networking** features.
The Universal Viewer ZFP is a viewing application. The Universal Viewer ZFP does not directly communicate using DICOM network protocols with external equipment however it does read DICOM objects from the Centricity Enterprise Archive or the Centricity PACS server. This section will define the DICOM objects supported by the application and any limitations dictated by DICOM defined content within the objects.
Table 2-1 lists the DICOM objects supported by the Universal Viewer ZFP for viewing purposes. Although the host server may support additional SOP Classes, the Universal Viewer ZFP is only able to interpret objects that meet the conditions in the table below.

Table 2-1 – Displayable SOP Classes

SOP Classes	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
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Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
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X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
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Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1

SOP Classes	SOP Class UID
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VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
NM Image (Retired)	1.2.840.10008.5.1.4.1.1.5
RT Image	1.2.840.10008.5.1.4.1.1.481.1
12-lead ECG Waveform Storage*	1.2.840.10008.5.1.4.1.1.9.1.1
Enhanced SR**	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR**	1.2.840.10008.5.1.4.1.1.88.33
Mammography CAD SR**	1.2.840.10008.5.1.4.1.1.88.50
Chest CAD SR**	1.2.840.10008.5.1.4.1.1.88.65
X-Ray Radiation Dose SR**	1.2.840.10008.5.1.4.1.1.88.67

* Limited capability to support display of Electrocardiogram. Refer section 2.3.3

**Basic display is supported.

2.2 IMPLEMENTATION MODE

2.2.1 Application Data Flow Diagram

2.2.1.1 Storage AE For SOP Instance Display

The Storage AE implements the SCP roles of the DICOM Storage SOP classes for storing DICOM Storage SOP instances.

Note: The Storage AE services are provided by their configured backend application server. As such, Universal Viewer ZFP does not directly handle DICOM network features related to Storage AE. It communicates to the backend application server using an internal service API.

Centricity PACS, Centricity PACS-IW, and Centricity Enterprise Archive backend application servers support a conceptual Storage AE that may be named differently in their conformance statements.

Please refer to the below link for DICOM Conformance Statement of the appropriate backend application server for more information.

CPACS

Centricity PACS 7.0: Direction # DOC2327903 Rev. 1

PACS 2.1 DICOM Conformance Statement (gehealthcare.com)

PACS-IW

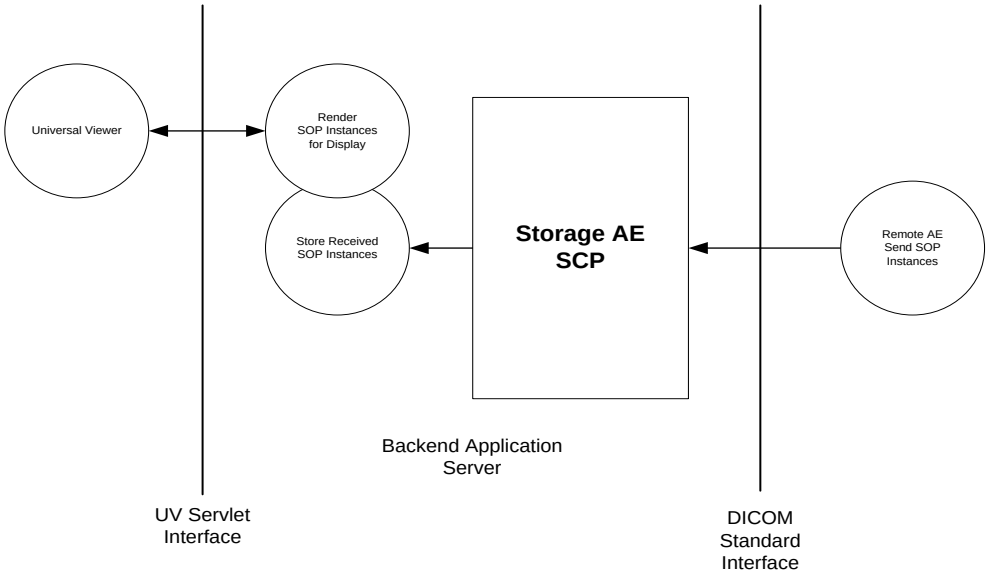
Centricity PACS-IW Server 5.0 DICOM Conformance Statement Rev3 (gehealthcare.com)

EA

Enterprise Archive 8.0: Direction # DOC2512664 Rev. 4

Centricity Enterprise Archive 4.0: Direction # DOC0708777 Rev. 21

Figure 2-1
Data Flow Diagram of Storage AE for SOP Instance Display



2.2.1.2 Send AE for SOP Instance Transfer to Remote AE

The Send AE implements the SCU roles of the DICOM Storage SOP classes for sending DICOM Storage SOP instances to a remote AE.

Note: The Send AE services are provided by their configured backend application server. As such, Universal Viewer ZFP does not directly initiate DICOM network features related to Send AE. It communicates to the backend application server using an internal service API.

At this time, only the Centricity PACS and Centricity Enterprise Archive backend application servers provide the Send AE service.

Please refer to the below link for DICOM Conformance Statement of the appropriate backend application server for more information.

CPACS

Centricity PACS 7.0: Direction # DOC2327903 Rev. 1

PACS 2.1 DICOM Conformance Statement (gehealthcare.com)

PACS-IW

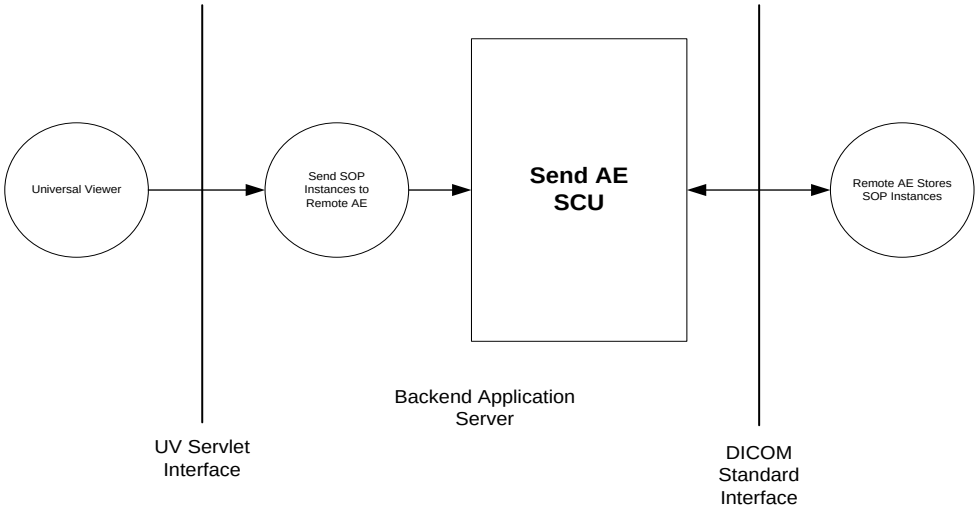
Centricity PACS-IW Server 5.0 DICOM Conformance Statement Rev3 (gehealthcare.com)

EA

Enterprise Archive 8.0: Direction # DOC2512664 Rev. 4

Centricity Enterprise Archive 4.0: Direction # DOC0708777 Rev. 21

Figure 2-2
Data Flow Diagram of Send AE Functionality



2.2.1.3 Query/Retrieve AE Functionality

Note: The Query/Retrieve AE services are provided by the configured backend application server. Universal Viewer ZFP communicates to the backend application server using a host service API and thus does not directly initiate DICOM network features related to Query/Retrieve.

Centricity PACS, Centricity PACS-IW, and Centricity Enterprise Archive backend application servers support Query/Retrieve AE.

Please refer to the below link for DICOM Conformance Statement of the appropriate backend application server for more information.

CPACS

Centricity PACS 7.0: Direction # DOC2327903 Rev. 1

PACS 2.1 DICOM Conformance Statement (gehealthcare.com)

PACS-IW

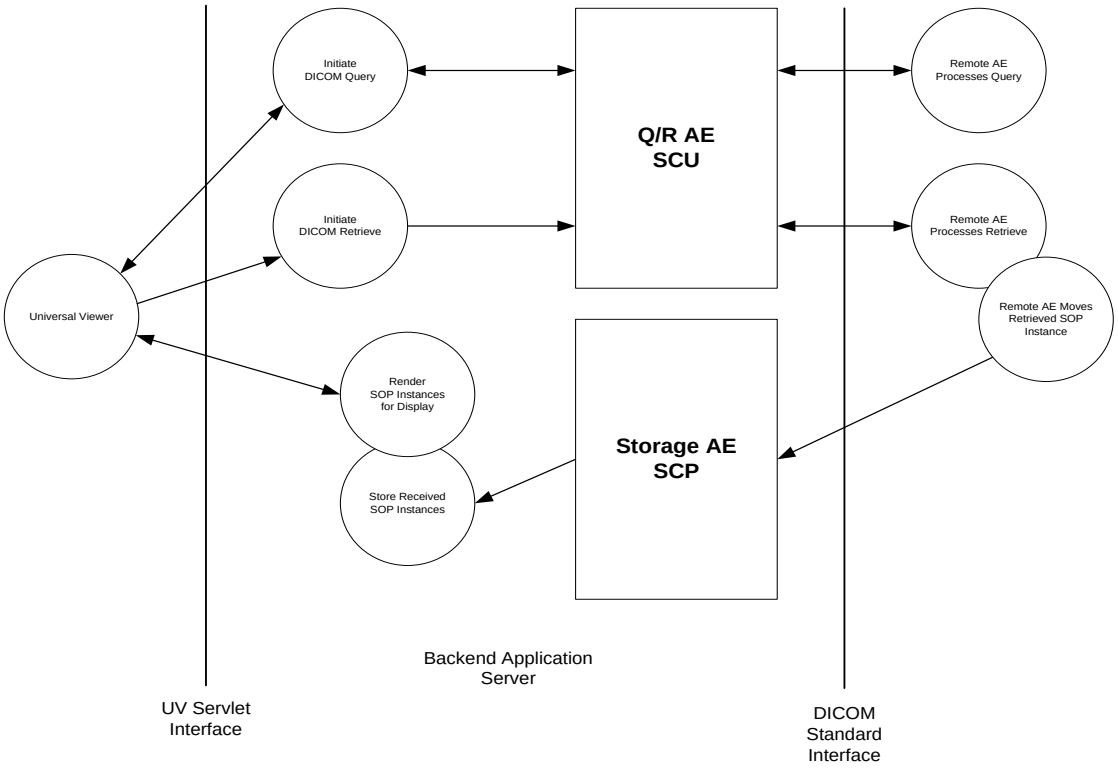
Centricity PACS-IW Server 5.0 DICOM Conformance Statement Rev3 (gehealthcare.com)

EA

Enterprise Archive 8.0: Direction # DOC2512664 Rev. 4

Centricity Enterprise Archive 4.0: Direction # DOC0708777 Rev. 21

FIGURE 2-3
DATA FLOW DIAGRAM OF QUERY/RETRIEVE AE FUNCTIONALITY



2.2.2 Real-World Activity – Viewing a DICOM Object

The user can load any supported DICOM object into the Universal Viewer ZFP for viewing.

2.2.3 Sequencing of Real-World Activities

2.2.3.1 Real-World Activity – Viewing a DICOM Object

The user may load any supported DICOM object into the Universal Viewer ZFP for viewing.

2.2.3.2 Real World Activity – Creation of Grayscale Presentation States

The user may create Grayscale Presentation States in the Universal Viewer ZFP and save the results in the configured backend server using direct access services.

2.3 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

2.3.1 Window/Level Computation

It is expected that optimal Window Center and Width values are specified in the DICOM Object Objects if they have greater than 8 bits of data stored per sample. If optimal Window Center and Width values are not provided, then Universal Viewer ZFP is capable of estimating values using histogram analysis.

2.3.2 Pixel Spacing Handling

The Universal Viewer ZFP supports use of the pixel spacing / Imager Pixel Spacing attributes described below for different types of images including secondary capture to calculate and display geometric measurement results in images. The user is strongly advised to verify the logic below is compatible with the pixel spacing / Imager Pixel Spacing / ERMF information provided by the modalities used at their site.

When displaying CR (SOP Class 1.2.840.10008.5.1.4.1.1.1), DX (SOP Class 1.2.840.10008.5.1.4.1.1.1.1 or 1.2.840.10008.5.1.4.1.1.1.1.1), XA (SOP Class 1.2.840.10008.5.1.4.1.1.12.1 or 1.2.840.10008.5.1.4.1.1.12.3), or RF (SOP Class 1.2.840.10008.5.1.4.1.1.12.2) images, the following table applies:

TABLE 2.2.1 Pixel Spacing Support

DICOM Attributes	Attributes existed in Header		Geometric Measurement for CR / DX image	Geometric Measurement for XA / RF
	YES	NO		
Pixel Spacing (0028,0030)	X			
Imager Pixel Spacing (0018,1164)		X		
ERMF (0018,1114)		X	in unit (cm)	in unit (cm)
Pixel Spacing (0028,0030)		X		
Imager Pixel Spacing (0018,1164)	X			
ERMF (0018,1114)		X	in unit (cm)	pixels
Pixel Spacing (0028,0030)	X		if PS = IPS, then in unit (Cm) If PS ≠ IPS, then in unit (cm) using PS	if PS = IPS, then pixels If PS ≠ IPS, then in unit (cm) using PS
Imager Pixel Spacing (0018,1164)	X			
ERMF (0018,1114)		X		
Pixel Spacing (0028,0030)		X		
Imager Pixel Spacing (0018,1164)		X		
ERMF (0018,1114)		X	pixels	pixels
Pixel Spacing (0028,0030)	X			
Imager Pixel Spacing (0018,1164)		X		
ERMF (0018,1114)	X		in unit (cm) using PS	in unit (cm) using PS
Pixel Spacing (0028,0030)		X		
Imager Pixel Spacing (0018,1164)	X			
ERMF (0018,1114)	X		in unit (cm) using IPS/ERMF	in unit (cm) using IPS/ERMF
Pixel Spacing (0028,0030)	X		if PS = IPS, then in unit (cm) using IPS/ERMF If PS ≠ IPS, then in unit (cm) using PS	if PS = IPS, then in unit (cm) using IPS/ERMF If PS ≠ IPS, then in unit (cm) using PS
Imager Pixel Spacing (0018,1164)	X			
ERMF (0018,1114)	X			

When displaying Breast Tomosynthesis Image which is converted to CT Objects(1.2.840.10008.5.1.4.1.1.2) the following table applies:

Table 2.2.2 Pixel Spacing (0028,0030) attribute for Breast Tomosynthesis Image which is converted to CT Object

DICOM Attribute	Attribute Present	Geometric Measurement
Pixel Spacing (0028,0030)	NO	pixels
Pixel Spacing (0028,0030)	YES	in unit (cm)

Note: When displaying MG images and the SOP Class UID (0008,0016) is Breast Tomosynthesis Image Storage (1.2.840.10008.5.1.4.1.1.13.1.3) , geometric measurement will always be in “Pixels”.

When displaying MG images and the SOP Class UID (0008,0016) is Digital Mammography X-Ray Image Storage - For Presentation (1.2.840.10008.5.1.4.1.1.1.2) then Pixel Spacing(0028,0030) is not used and the following table applies:

Table 2.2.3 Imager Pixel Spacing (0018,1164) / ERMF (0018,1114) attributes for Digital Mammography X-Ray Image Storage - For Presentation

DICOM Attribute	Attribute Present	Geometric Measurement
Imager Pixel Spacing (0018,1164)	NO	pixels
ERMF (0018,1114)	NO	pixels
Imager Pixel Spacing (0018,1164)	YES	in unit (cm) using IPS/ERMF
ERMF (0018,1114)	YES	

2.3.3 Electrocardiogram Support

The Universal Viewer ZFP supports display of 12 Lead Electrocardiogram Waveform IODs from GE products and their attributes with the limitations as described below.
Waveform display

ZFP will support ECG waveform display if the DICOM file conforms to the below table. Any value other than the expected values will result in invalidating the DICOM file and user will be presented with an error message.

Attribute Name	Tag	Type	Expected Value
Waveform Originality	(003A, 0004)	1	ORIGINAL (Only one sequence should be present) DERIVED (Only one sequence should be present)
Number of Waveform Channels	(003A, 0005)	1	<=13 (including

			all standard 12 leads + “-aVR”)
>>Channel Baseline	(003A, 0213)	1C	0
>>Channel Time Skew	(003A, 0214)	1C	0
>>Channel Sample Skew	(003A, 0215)	1C	0
>>Channel Offset	(003A, 0218)	3	0
Channel Sensitivity	(003A, 0210)	1C	Has to be present with a Non zero value. Although DICOM says its optional, but ZFP mandates it.
Channel Sensitivity Units Sequence	(003A, 0211)	1C	Millivolt or Microvolts DICOM says its optional, but ZFP mandates it.
Manufacturer	(0008, 0070)	2	“GE Healthcare” or “GE Medical Systems”
Waveform Bits Stored	(003A,021A)	1	16
Waveform Bits Allocated	(5400,1004)	1	16
Waveform Sample Interpretation	(5400,1006)	1	SS
Waveform Padding Value	(5400,100A)	1C	0

2.3.3.1 Coding Scheme Designator validations

ZFP will validate and parse a DICOM file and if the following Coding Scheme designators are adhered to, otherwise an error will be thrown to user:

Attribute Name	Tag	Supported coding scheme designator
Channel Sensitivity Unit sequence	(003A, 0211)	UCUM
Channel Source Sequence	(003A, 0208)	SCPECG

2.3.3.2 Pacemaker Annotation

Per DICOM. Pacemaker annotations like other annotations can be linked to specific channels/leads. ZFP does not accept pace maker annotation with any lead information. It just accepts a set of points on the 10 second time scale (in terms of TimeValue (ms) or SamplePosition).

ZFP will check if the pace maker information applies to all the channels or not. If not, throw an exception.
ZFP will identify if an annotation is pace maker annotation or not based on code value 5.10.1.2 and scheme as SCPECG.

Code Value	SH	8	5.10.1.2
Coding Scheme Design	SH	8	SCPECG
Coding Scheme Version	SH	4	1.3
Code Meaning	LO	16	Pacemaker Spike

The pacemaker information will be read when the below conditions are satisfied. In case it is not satisfied, no error will be thrown but just the pace maker information will not be displayed on the waveform

Attribute Name	**Tag**	**Expected Value**
Waveform Originality	(0040, A0B0)	1\0 (Applies to all the channels within the multiplex group)
Temporal Range Type	(0040, A130)	POINT
Referenced Sample Positions	(0040, A132)	"TimeValue" (GE modality specific) – NonDICOM, or "SamplePosition"

2.3.4 Basic display support

ZFP reads the DICOM SR content and it converts the SR content tree to XML for display. Below are the DICOM classes, for which basic display is supported.

Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67

2.3.5 Support for high resolution images

The Universal Viewer ZFP may down sample the display of high resolution images for displays with limited resolution. Please refer to the admin manual configuration of the maximum resolution for different devices. All measurements, annotations and GSPS are supported in down sampled images except for the DICOM Overlay Activation Module (group 60xx) .

Image overlays are down sampled as well. Measurements provided in pixels are based on the down sampled image matrix size, and not the original image matrix size. When down sampled and saving annotations on scaled down image, the saved coordinates are per the original image resolution.

2.3.6 Grayscale Softcopy Presentation State Annotation units

ZFP reads the Grayscale Softcopy Presentation State content and displays it on the referenced images. ZFP does not support DISPLAY or MATRIX units in annotations and considers annotations in image relative position i.e. PIXEL space.

Element	Attribute Name	Tag	Expected Value
Text Object	Bounding Box Annotation Units	(0070,0003)	PIXEL
Text Object	Anchor Point Annotation Units	(0070,0004)	PIXEL
Graphic Object	Graphic Annotation Units	(0070,0005)	PIXEL
Compound Graphic Object	Compound Graphic Units	(0070,0282)	PIXEL

If Graphic Annotation Units or Compound Graphic Units have DISPLAY or MATRIX annotation unit, then the Graphic object or Compound Graphic object will not be presented. Otherwise, the objects will be considered to be with PIXEL and ZFP will try to present the objects.

ZFP tries to present the Text Object to the default point of origin (0, 0), relative to image, if the annotation unit is DISPLAY or MATRIX in Bounding Box Annotation Units and/or Anchor Point Annotation Units.

2.4 SUPPORT OF EXTENDED CHARACTER SETS

The Universal Viewer ZFP is configurable with a single single-byte or multi-byte extended character set, depending on the language selected during installation of the system. The following extended Character Sets are supported:

TABLE 2.3 Extended Character Set Support

Encoding	DICOM Term in Specific Character Set (0008,0005)	Supported Languages
ASCII	Attribute is not present or ISO IR-6	English
Latin-1	ISO IR-100	English, Faeroese, Finnish, French, German, Italian, Portuguese, Spanish,
Latin-2	ISO IR-101	English, Polish, Hungarian.
Latin/Cyrillic	ISO IR-144	English, Russian
Latin/Hebrew	ISO IR-138	English, Hebrew
JIS X 0201	ISO IR-13	English, Japanese (in Katakana alphabet). Limited use as Japanese encoding does not support hieroglyphic alphabet
JIS X 0208	ISO 2022 IR-87	English, Japanese Kanji (hieroglyphic) – uses escape sequences to switch between ASCII (single byte) and Japanese (two-byte per character)
KS X 1001	ISO 2022 IR-149	English, Korean – uses escape sequences to switch between ASCII (single byte) and Korean (two-byte per character)

GB18030	GB18030	English, Simplified Chinese
UTF8 for Dicom Web Services	UTF8	All supported languages

While the backend servers may support additional character sets, the Universal Viewer ZFP will display in the user interface only characters specified as within ISO IR-6 (ASCII) or the configured extended character set.

The user interface will allow the user to enter characters from the console keyboard that are within ASCII or the configured extended character set.

Whether character sets are displayed correctly depends on the characteristics of the backend system, the validity of the DICOM header contents, and the presence of appropriate fonts on the client system.

2.5 PHOTOMETRIC INTERPRETATION SUPPORT

While the backend server may support additional values for photometric interpretation, the Universal Viewer ZFP will only display SOP instances that contain one of the following values for Photometric Interpretation (0028,0004):

- MONOCHROME1
- MONOCHROME2
- RGB
- YBR_FULL: Supported
- YBR_FULL_422: Supported. Note: JPEG Baseline (1.2.840.10008.1.2.4.50) Transfer Syntax only - SDK doesn't decompress
- YBR_PARTIAL_422: Retired
- YBR_PARTIAL_420: Supported. Note: MPEG2, MPEG-4 AVC/H.264 and HEVC/H.265 (1.2.840.10008.1.2.4.10X) Transfer Syntaxes only - SDK doesn't decompress
- YBR_ICT: Supported
- YBR_RCT: Supported

2.6 SECURITY PROFILES

The product does not conform to any defined DICOM Security Profiles.
It is assumed that the product is used within a secured environment. It is assumed that a secured environment includes at a minimum:

1. Firewall or router protections to ensure that only approved external hosts have network access to the product.
2. Firewall or router protections to ensure that the product only has network access to approved external hosts and services.
3. Any communications with external hosts and services outside the locally secured environment use appropriate secure network channels (such as a Virtual Private Network (VPN))

2.7 DICOM WEB SERVICE

DICOMWEB(TM) NETWORK APPLICATION MODEL AND DATA FLOW DIAGRAM

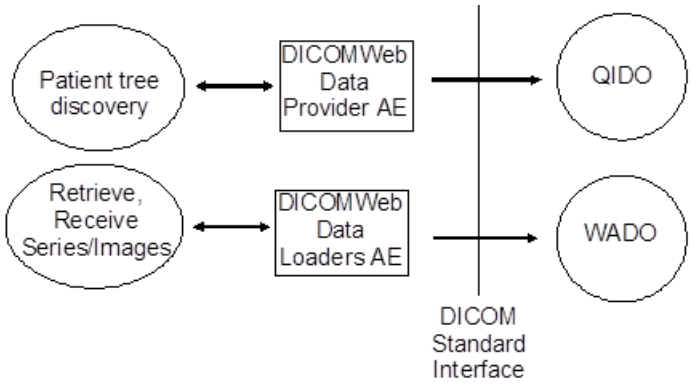


TABLE 2.4 Network Services

Network Service	User of Service (Client)	Provider of Service (Server)
WADO - URI - Retrieve Rendered Imaging Document	Yes	No
WADO-RS	Yes	No
QIDO-RS	Yes	No

2.7.1 WADO-URI Specification

This Universal Viewer ZFP Patient Timeline product implements the WADO-URI services as a client user for access to rendered DICOM SOP Instances that are stored on a server supporting DICOM WADO-URI service.

TABLE 2.5 WADO-URI Retrieve Imaging Document Specification

Parameter	Restrictions
Mime Type	Image JPEG

2.7.2 WADO-RS Specification

This Universal Viewer ZFP product implements the WADO-RS services as a client user for access to rendered DICOM SOP Instances that are stored on a server supporting DICOM WADO-RS service. The Retrieve Transaction user agent can request the following resources:

TABLE 2.6 Resources Retrieve Transaction - User Agent

Transaction	Resource	Comments

Retrieve	*Instance*	The implementation follows the standard URI pattern "{SERVICE}/studies/{StudyInstanceUID}/series/{SeriesInstanceUID} /instances/{SOPInstanceUID} Within the {SERVICE} part consumers can provide the AE title if the VNA supports the handling of multiple AETs

The Retrieve Transaction user agent supports the following Query Parameters:

The Media Type column Identifies if the query parameter is valid for **D**ICOM (D) and/or for **R**endered Media type (R).

TABLE 2.7 Query Parameters Retrieve Transaction - User Agent

Query Parameter	Value Type	Media Type	Supported values	Comments
Accept	*Media-type*	*D, R*	See table 2.1 Transfer Syntaxes with DICOMWeb bulk data media type	

The Retrieve Transaction user agent supports the following Header Fields:

The Media Type column Identifies if the query parameter is valid for **D**ICOM (D) and/or for **R**endered Media type (R).

TABLE 2.8 Header Fields Retrieve Transaction - User Agent

Header Field	Value Type	Media Type	Supported values	Comments
Accept	*DICOM media-type* *(application/ dicom)*	***D***	*multipart/related; type="application/dicom"; transfer-syntax={uid}*	See in the overview section table 2-3.2-1 the supported DICOM SOP Classes / table 2-3.2-2 Transfer Syntaxes

TABLE 2.9 WADO-RS Retrieve Imaging Document Specification

Parameter	Supported
Mime Type	application/dicom

2.7.3 QIDO-RS Specification

This Universal Viewer ZFP product implements the QIDO-RS services as a client user for access to rendered DICOM SOP Instances that are stored on a server supporting DICOM QIDO-RS service.

TABLE 2.10 Resources Search Transaction - User Agent

Transaction	Resource	Comments
Search	All studies	
	All series	

	All instances	
	Study's Series	
	Study's instances	
	Study Series's Instances	

TABLE 2.11 lists the DICOM query attributes supported by the Search Transaction user agent.

Attribute Name	Tag	Matching Key	Return Key	Comments
Study Level (May be used for All studies, All series, All instance resource query)				
SpecificCharacterSet	(0008,0005)	No	Yes	
StudyDate	(0008,0020)	No	Yes	
StudyTime	(0008,0030)	No	Yes	
AccessionNumber	(0008,0050)	No	Yes	
ModalitiesInStudy	(0008,0061)	No	Yes	
ReferringPhysicianName	(0008,0090)	No	Yes	
TimezoneOffsetFromUTC	(0008,0201)	No	Yes	
PatientName	(0010,0010)	No	Yes	
PatientID	(0010,0020)	No	Yes	
PatientBirthDate	(0010,0030)	No	Yes	
PatientSex	(0010,0040)	No	Yes	
StudyInstanceUID	(0020,000D)	Yes	Yes	
StudyID	(0020,0010)	No	Yes	
NumberOfStudyRelatedSeries	(0020,1206)	No	Yes	
NumberOfStudyRelatedInstances	(0020,1208)	No	Yes	
Series Level (May be used for All Series, Study's Series, Study's Instances, All Instances resource query)				
SpecificCharacterSet	(0008,0005)	No	Yes	
Modality	(0008,0060)	No	Yes	
TimezoneOffsetFromUTC	(0008,0201)	No	Yes	
SeriesDescription	(0008,103E)	No	Yes	
SeriesInstanceUID	(0020,000E)	Yes	Yes	
SeriesNumber	(0020,0011)	No	Yes	
NumberOfSeriesRelatedInstances	(0020,1209)	No	Yes	
PerformedProcedureStepStartDate	(0040,0244)	No	Yes	
PerformedProcedureStepStartTime	(0040,0245)	No	Yes	
RequestAttributeSequence	(0040,0275)	No	Yes	
> RequestedProcedureID	(0040,1001)	No	Yes	
> ScheduledProcedureStepID	(0040,0009)	No	Yes	
Instance Level (May be used for All instances, Study's instance, Study Series's instance resource query)				
SpecificCharacterSet	(0008,0005)	No	Yes	
SOPClassUID	(0008,0016)	No	Yes	
SOPInstanceUID	(0008,0018)	Yes	Yes	
InstanceAvailability	(0008,0056)	No	Yes	

Attribute Name	Tag	Matching Key	Return Key	Comments
TimezoneOffsetFromUTC	(0008,0201)	No	Yes	
RetrieveURL	(0008,1190)	No	Yes	
InstanceNumber	(0020,0013)	No	Yes	
Rows	(0028,0010)	No	Yes	
Columns	(0028,0011)	No	Yes	
BitsAllocated	(0028,0100)	No	Yes	
NumberOfFrames	(0028,0008)	No	Yes	

TABLE 2.12 QIDO-RS Retrieve Imaging Document Specification

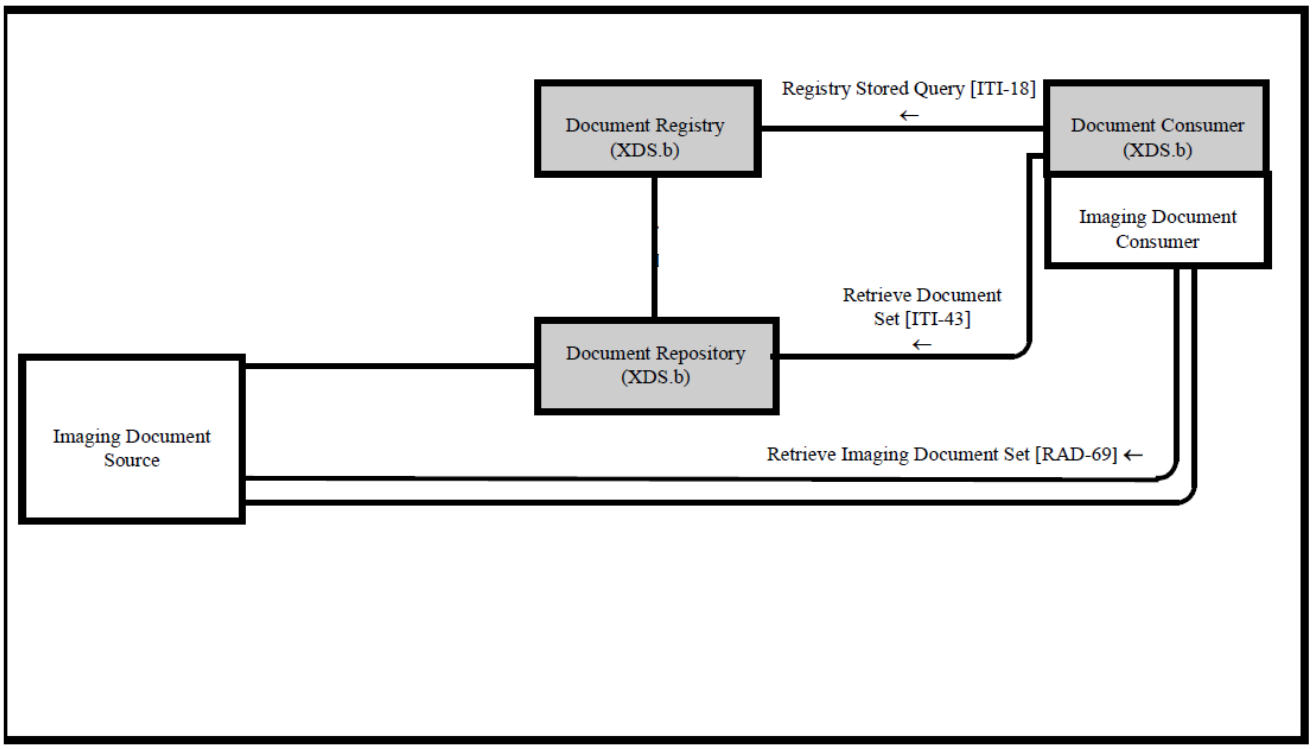
Parameter	Supported
Mime Type	application/dicom+json

2.7.4 Status Code details of DICOM Web services :

Status Class	Code	Behavior [Describe the Application behavior when receiving the status code]
Success	200 (Success)	DICOM web service will log – Successfully retrieved search records
	204 (No-Content)	DICOM web service will log – No search result is retrieved.
	206 (Partial Content)	Status code is 200, Partial flag is sent from DICOM web service application
Client Error	400 (Bad Request)	DICOM web service will log the actual error.
	401 (Unauthorized)	DICOM web service will log the actual error
	403 (Forbidden)	DICOM web service will log the actual error
	404 (Not Found)	DICOM web service will log the actual error
	405 (Method Not Allowed)	DICOM web service will log the actual error
	406 (Not AccepTable)	DICOM web service will log the actual error
	409 (Conflict)	DICOM web service will log – Unable to process search request.
	410 (Gone)	DICOM web service will log the actual error
	411 (Length Required)	DICOM web service will log – Unable to process search request.
	413 (Payload Too Large)	DICOM web service will log the actual error
	414 (URI Too Long)	DICOM web service will log – Unable to process search request.
	415 (Unsupported Media Type)	DICOM web service will log the actual error
Server Error	500 (Internal Server Error)	DICOM web service will log – Unable to process search request.
	501(Not Implemented)	DICOM web service will log the actual error

Status Class	Code	Behavior [Describe the Application behavior when receiving the status code]
	503 (Service Unavailable)	DICOM web service will log – Unable to process search request.
	505 (HTTP Version Not Supported)	DICOM web service will log the actual error

2.8 RETRIVE IMAGING DOCUMENT SET



This Universal Viewer ZFP product(Imaging Document Consumer) uses implements the RAD-69 services as a client user for access to rendered DICOM SOP Instances that are stored on a server supporting DICOM RAD-69 Retrieve Imaging document set service.

To retrieve document ID, application uses ITI-18 (Registry Stored Query) and to retrieve KOS document, ZFP application (imaging document consumer) uses ITI-43 IHE protocol, using which all the SOP instances information is sent to RAD-69 enable imaging source by using SOAP based protocol.

2.9 AUDIT TRAIL MESSAGES

The Universal Viewer ZFP supports the Audit Trail Message Format Profile. The following subsections define message details and specializations used by this product.

2.9.1 Application Activity

This audit message describes the event of users logging in or out of the application, launching an external application and it includes the following IHE transactions: ITI-2.

TABLE 2.13.1 Audit Message for Application Activity – by server

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110114, DCM, " UserAuthentication")
	EventActionCode	M	Enumerated Value E = Execute
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
	EventTypeCode	M	DT (110122, DCM, "Login") DT (110123, DCM, "Logout")
Active Participant: Process Accepting the Login/Logout (1)	UserID	M	ZFP Server URL
	UserName	U	Name of the ZFP server
	UserIsRequestor	U	False
	RoleIDCode	M	EV (110150, DCM, "Application")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	IP Address
Active Participant: User Logging Into/Logging out from Application (1)	UserID	M	Logged in User Account ID
	UserIsRequestor	U	True when user logs in/out
	RoleIDCode	U	EV (110151, DCM, "Application Launcher")
	NetworkAccessPointTypeCode	U	2
	NetworkAccessPointID	U	ZFP Client Node IP Address
Audit Source Identification	AuditSourceID	U	ZFP AuditSourceID (Configurable)
	Code	U	4

TABLE 2.13.2 Audit Message for Application Activity – Outbound Launch by ZFP Client

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110100, DCM, " Application Activity ")
	EventActionCode	M	Enumerated Value E = Execute
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
	EventTypeCode	M	DT (110120, DCM, "Application Start")
Active Participant: Process Accepting the Request (1)	UserID	M	ZFP Server URL
	AlternativeUserID	U	ZFP Server Node IP Address
	UserIsRequestor	U	True if launched by external application.
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	IP Address
Active Participant: User Launching Application (0..1)	UserID	M	Logged in User Account ID
	UserIsRequestor	U	True if ZFP client is a user.
	RoleIDCode	U	EV(121007,DCM,Person)
	NetworkAccessPointTypeCode	U	2
	NetworkAccessPointID	U	ZFP Client Node IP Address
Active Participant: External Application Launched (0 ..1)	UserID	M	URL Launched
	UserIsRequestor	U	false
	RoleIDCode	U	EV (110151, DCM, "Application Launcher")
Audit Source Identification	AuditSourceID	U	ZFP AuditSourceId (Configurable)
	Code	U	4

This audit message describes the event of users sharing studies to MS-Teams and it includes the following IHE transactions:

TABLE 2.13.3 Audit Message for Application Activity – MsTeams study App

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110100, DCM, " Application Activity ")

	EventActionCode	M	Enumerated Value
			E = Execute
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
	EventTypeCode	M	DT (110120, DCM, "Application Start")
Active Participant: Process Accepting the Request (1)	UserID	M	ZFP Server URL
	AlternativeUserID	U	ZFP Server Node IP Address
	UserIsRequestor	U	FALSE
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	1/2
	NetworkAccessPointID	M	ZFP Server Node Machine Name / IP Address
Active Participant: User Launching Application (0..1)	UserID	M	Logged in MSTeams User Account
	UserIsRequestor	U	TRUE
	RoleIDCode	U	EV (110151, DCM, "Application Launcher")
	NetworkAccessPointTypeCode	U	2
	NetworkAccessPointID	U	ZFP Client Node IP Address
Active Participant: External Application Launched (0..1)	UserID	M	Channel URL
	AlternativeUserID	U	Channel Name
	UserIsRequestor	U	FALSE
	RoleIDCode	U	EV (110150, DCM, "Application")
Audit Source Identification	AuditSourceID	U	ZFP AuditSourceId (Configurable)
	Code	U	4

2.9.2 Instance Accessed with ZFP

This message describes the event of Instance accessed by ZFP.

TABLE 2.14 Audit Message for Instance Accessed / Study Used

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110103, DCM, "DICOM Instances Accessed")
	EventActionCode	M	Enumerated Value R = Read C = Create (for SaveGSPS)
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
Active Participant: User sharing Study (0..1)	UserID	M	Logged in User Account ID
	UserIsRequestor	M	True
	RoleIDCode	M	EV(121007,DCM,Person)
Active Participant: User observing the study (0..n)	UserID	M	Third party login user id.
	UserIsRequestor	U	False
	RoleIDCode	M	EV(121007,DCM,Person)
Participating Object: Studies being accessed (1)	ParticipantObjectTypeCode	M	2
	ParticipantObjectTypeCodeRole	M	3
	ParticipantObjectIDTypeCode	M	EV (110180,DCM,"Study Instance UID")
	ParticipantObjectID	M	Study Instance UID
	SOPClass	MC	SOPClassUID
	Accession	U	Study Accession number
	NumberOfInstances	U	SopClass number of instances
Participating Object: Patient being accessed (2)	ParticipantObjectTypeCode	M	1
	ParticipantObjectTypeCodeRole	M	1

	ParticipantObjectIDTypeCode	M	EV(2, DCM, “Patient Number”)
	ParticipantObjectID	M	Patient Identifier
	ParticipantObjectName	U	PatientName
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4

2.9.3 Query

This message describes the event of a Query being issued or received. It includes the following IHE transactions: RAD-14 / RAD-15 / RAD-26 / RAD-30 / RAD-44/RAD-68.

TABLE 2.15 Audit Message for Query

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110112, DCM, "Query")
	EventActionCode	M	Enumerated Value: E = Execute
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
Active Participant: User requesting Query (1)	UserID	M	Logged in User Account ID
	UserIsRequestor	M	True
	RoleIDCode	M	EV (110153, DCM, "Source Role ID")
	NetworkAccessPointID	U	ZFP Server Node IP Address
Active Participant: System requesting Query (0..1)	UserID	M	Image streaming URL
	UserIsRequestor	U	False
	RoleIDCode	M	EV (110153, DCM, "Source Role ID")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	EA/CPACS IP Address of archives to search
System responding to query (1)	UserID	M	AETitle
	UserIsRequestor	U	False
	RoleIDCode	M	EV (110152, DCM, "Destination Role ID")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	IP Address of archives to search
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4
Participating Object: SOP Queried and the Query (1)	ParticipantObjectTypeCode	M	Enumerated Value: 4
	ParticipantObjectTypeCodeRole	M	Enumerated Value: 3 = report
	ParticipantObjectIDTypeCode	M	EV (110181, DCM, "SOP Class UID")
	ParticipantObjectID	M	UID of the SOP Class being query.
	ParticipantObjectDetail	MC	Type value = “Detail” and the Value of the attribute is the Patient/Study details being queried. The element content is an xs:base64Binary encoding.

AUDIT MESSAGE FOR PDQ QUERY

This message describes the event of a Patient Demographics Query being issued or received. It includes the following IHE transactions: ITI-21.

TABLE 2.16 Audit Message for PDQ Query

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110112, DCM, "Query")
	EventActionCode	M	Enumerated Value: E = Execute
	EventDateTime	M	System Current Date

	EventOutcomeIndicator	M	0
	EventTypeCode	M	EV (“ITI-21”, IHE Transactions, "Patient Demographics Query")
Active Participant: System requesting Query (1)	UserID	M	ZFP Server URL
	AlternativeUserID	M	Logged in User Account ID
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	1/2
	NetworkAccessPointID	M	ZFP Server Node Machine Name /IP Address
Active Participant: Human Requestor (1)	UserID	M	Logged in User Account ID
	UserIsRequestor	U	True
	RoleIDCode	U	EV (110151, DCM, "Person")
	NetworkAccessPointTypeCode	U	2
	NetworkAccessPointID	U	ZFP Client Node IP Address
Active Participant: System responding to Query (1)	UserID	M	PdqSupplierApplicationName | PdqSupplierFacilityName (Configurable)
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	MPI, FQDN, IP Address
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4
Participating Object: Patient Queried (optional – only used with enterprise patient identifier query)(0..1)	ParticipantObjectTypeCode	M	Enumerated Value: 1
	ParticipantObjectTypeCodeRole	M	Enumerated Value: 1
	ParticipantObjectIDTypeCode	M	EV (“2”, DCM, "Patient Number")
	ParticipantObjectID	M	Patient Identifier and Affinity Domain values to be queried
Participating Object: Patient Queried and the Query (1)	ParticipantObjectTypeCode	M	Enumerated Value: 2 = system
	ParticipantObjectTypeCodeRole	M	Enumerated Value: 24
	ParticipantObjectIDTypeCode	M	EV (“ITI-21”, IHE Transactions, "Patient Demographics Query")
	ParticipantObjectQuery	M	This field holds the PDQ query details as xs:base64Binary encoded.
	ParticipantObjectDetail	MC	The Type = “MSH-10” and the value of this attribute is the double encoded timestamp of the request. The element content is an xs:base64Binary encoding.

AUDIT MESSAGE FOR PIX QUERY

This message describes the event of a Patient Identifier Query being issued or received. It includes the following IHE transactions: ITI-9.

TABLE 2.17 Audit Message for PIX Query

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110112, DCM, "Query")
	EventActionCode	M	Enumerated Value: E = Execute
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
	EventTypeCode	M	EV (“ITI-9”, IHE Transactions, "PIX Query")
Active Participant: System requesting Query (1)	UserID	M	ZFP Server URL
	AlternativeUserID	M	Logged in User Account ID
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	ZFP Server Node Machine Name / IP Address
Active Participant: Human Requestor (1)	UserID	M	Logged in User Account ID
	UserIsRequestor	U	True
	RoleIDCode	U	EV (110151, DCM, "Person")
	NetworkAccessPointTypeCode	U	2
	NetworkAccessPointID	U	ZFP Client Node IP Address
Active Participant: System responding to Query (1)	UserID	M	PixManagerApplicationName | PixManagerFacilityName (Configurable)

	UserIsRequestor	M	False
	RoleIDCode	M	EV (110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	MPI FQDN IP Address
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4
Participating Object: Patient Queried (1)	ParticipantObjectTypeCode	M	Enumerated Value: 1
	ParticipantObjectTypeCodeRole	M	Enumerated Value: 1
	ParticipantObjectIDTypeCode	M	EV (“2”, DCM, "Patient Number")
	ParticipantObjectID	M	Patient Identifier and Assigning Authority values to be queried
Participating Object: Patient Query (1)	ParticipantObjectTypeCode	M	Enumerated Value: 2 = system
	ParticipantObjectTypeCodeRole	M	Enumerated Value: 24
	ParticipantObjectIDTypeCode	M	EV (“ITI-9”, IHE Transactions, "PIX Query")
	ParticipantObjectQuery	M	This field holds the PIX query details as xs:base64Binary encoded.
	ParticipantObjectDetail	MC	The Type = “MSH-10” and the value of this attribute is the double encoded timestamp of the request. The element content is an xs:base64Binary encoding.

2.9.4 Registry Stored Query

This message describes the event of ITI-18 i.e. Registry Stored Query.

TABLE 2.18 Audit Message for Registry Stored Query

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110112, DCM, "Query")
	EventActionCode	M	Enumerated Value: E = Execute
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
	EventTypeCode	M	EV (“ITI-18”, IHE Transactions, "Registry Stored Query")
Active Participant (1): System processing request.	UserID	M	ZFP Server URL
	AlternativeUserID	M	ZFP Server Node Machine name / IP Address
	UserIsRequestor	U	True
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	IP Address
Active Participant (1): User processing request.	UserID	M	Logged in User Account ID
	UserIsRequestor	U	True
	RoleIDCode	M	EV (110151, DCM, "Person")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	ZFP Client Node IP Address
Active Participant (1): System to receive request.	UserID	M	Registry URL for Registry Stored Query (for XDS, XDS-I profile), Initiating Gateway URL for Registry Stored Query (For XCA-I profile)
	AlternativeUserID	U	Registry URL for Registry Stored Query
	UserIsRequestor	U	False
	RoleIDCode	M	EV (110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	FQDN of XDS Registry (for XDS , XDS-i profile), FQDN of Initiating Gateway (For XCA-I profile)
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4
Participating Object: Patient to query (0..1)	ParticipantObjectTypeCode	M	1
	ParticipantObjectTypeCodeRole	M	1
	ParticipantObjectIDTypeCode	M	EV(2, DCM, “Patient Number”)
	ParticipantObjectSensitivity	U	Patient Name
	ParticipantObjectID	M	Patient Identifier and Affinity Domain values to be queried
Participating Object: Registry query (1)	ParticipantObjectTypeCode	M	2
	ParticipantObjectTypeCodeRole	M	24
	ParticipantObjectIDTypeCode	M	EV (“ITI-18”, IHE Transactions, "Registry Stored Query")

	ParticipantObjectID	M	Urn:uuid for Registry Stored Query
	ParticipantObjectDescription	U	This field holds the dataset of the registry stored query, xs:base64 binary encoded.

2.9.5 Retrieve Document Set

This message describes an event of Retrieve Document Set and it includes the following transaction ITI-43.

TABLE 2.19 Audit Message for Retrieve Document Set

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110107, DCM, "Import")
	EventActionCode	M	Enumerated Value: C = Create
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
	EventTypeCode	M	EV("ITI-43", IHE Transactions, "Retrieve Document Set")
Active Participant (1): Repository System	UserID	M	Repository URL (for XDS profile, XDS-i profile) Initiating Gateway URL (For XCA-I profile)
	AlternativeUserID	U	"Repository"
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	FQDN of XDS Repository (for XDS , XDS-i profile), FQDN of Initiating Gateway (For XCA-I profile)
Active Participant (1): System requesting document set	UserID	M	Logged in User Account ID
	AlternativeUserID	M	ZFP AuditSourceId (Configurable)
	UserIsRequestor	U	False
	RoleIDCode	M	EV (110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	1/2
	NetworkAccessPointID	U	ZFP Server Node Machine Name/ IP Address
Active Participant (1): User requesting document set	UserID	M	Logged in User Account ID
	UserIsRequestor	U	True
	RoleIDCode	M	EV (110151, DCM, "Person")
	NetworkAccessPointTypeCode	U	2
	NetworkAccessPointID	U	ZFP Client Node IP Address
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4
Participating Object (1): Requested Document	ParticipantObjectTypeCode	M	2
	ParticipantObjectTypeCodeRole	M	3
	ParticipantObjectIDTypeCode	M	EV(9, DCM, "Report Number")
	ParticipantObjectDetail	M	Type="Repository Unique Id"; Value=<Repository OID>, xs:base64Binary encoded.
Participating Object (0..1): Patient Information	ParticipantObjectTypeCode	M	1
	ParticipantObjectTypeCodeRole	M	1
	ParticipantObjectIDTypeCode	M	EV(2, DCM, "Patient Number")
	ParticipantObjectID	M	Patient Identifier and Affinity Domain values to be queried
	ParticipantObjectName	U	Patient Name

2.9.6 Update Document Set

This message describes an event of Update Document Set (document administrator) and it includes the following transaction: ITI-57.

TABLE 2.20 Audit Message for Update Document Set

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110106, DCM, "Export")
	EventActionCode	M	Enumerated Value: U = Update

	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
	EventTypeCode	M	EV(“ITI-57”, IHE Transactions, “Update Document Set”)
Active Participant: User updating document (1)	UserID	M	Logged in User Account ID
	AlternativeUserID	M	ZFP Process ID
	UserIsRequestor	M	True
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	1
	NetworkAccessPointID	M	ZFP Server Machine Name
Active Participant: Registry System (1)	UserID	M	Registry Update URL
	AlternativeUserID	U	Registry Update URL
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	1
	NetworkAccessPointID	M	XDS Registry FQDN IP Address
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4
Participating Object: Patient with document to be updated (1)	ParticipantObjectTypeCode	M	1
	ParticipantObjectTypeCodeRole	M	1
	ParticipantObjectIDTypeCode	M	EV(2, DCM, “Patient Number”)
	ParticipantObjectID	M	Patient Identifier and Affinity Domain values for document
	ParticipantObjectName	U	Patient Name
Participating Object: Document to be updated	ParticipantObjectTypeCode	M	2
	ParticipantObjectTypeCodeRole	M	20
	ParticipantObjectIDTypeCode	M	EV(Document UUID, “IHE XDS Metadata”, Submission Set ClassificationNode”)
	ParticipantObjectID	M	Submissionset Unique ID

2.9.7 Document Viewed

This message describes the event of viewing data in the system, e.g. open document.

TABLE 2.21 Audit Message for Document Viewed

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110103, DCM, "Instances Accessed")
	EventActionCode	M	Enumerated Value: R = Read
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
	EventTypeCode	M	EV(“DocumentViewed”, ZFP-XDS Transactions, “Document Viewed”)
Active Participant (1): System	UserID	M	ZFP Server URL
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	1
	NetworkAccessPointID	M	ZFP Server Machine Name
Active Participant (1): User viewing document.	UserID	M	Logged in User Account ID
	UserIsRequestor	M	True
	RoleIDCode	M	EV (110151, DCM, "Person")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	ZFP Client Node IP Address
Participating Object: Document being Viewed (1..n)	ParticipantObjectTypeCode	M	2
	ParticipantObjectTypeCodeRole	M	3
	ParticipantObjectIDTypeCode	M	EV(9, DCM,”Report Number”) or EV(110180, DCM,” Study Instance UID”)
	ParticipantObjectID	M	Document Unique ID
Participating Object: Patient Information Viewed (1)	ParticipantObjectTypeCode	M	1
	ParticipantObjectTypeCodeRole	M	1
	ParticipantObjectIDTypeCode	M	EV(2, DCM,”Patient Number”)
	ParticipantObjectID	M	Patient Identifier and Affinity Domain values for document
	ParticipantObjectName	U	Patient Name
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4

2.9.8 Document Download

This message describes the event of exporting data from the system, e.g. download document.

TABLE 2.22 Audit Message for Document Download

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110107, DCM, "Import")
	EventActionCode	M	Enumerated Value: C = Create
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
	EventTypeCode	M	EV("DocumentDownload", ZFP-XDS Transactions, "Document Download")
Active Participant (1):	UserID	M	Logged in User Account ID
	UserIsRequestor	M	True
	RoleIDCode	M	EV (110151, DCM, "Person")
	NetworkAccessPointTypeCode	U	2
	NetworkAccessPointID	U	ZFP Client Node IP Address
Active Participant (1):	UserID	M	ZFP Server URL
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110152, DCM, "Destination")
	NetworkAccessPointID	M	ZFP Server Machine Name
Active Participant (1):	UserID	M	Logged in User Account ID
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110155, DCM, " Source Media")
	NetworkAccessPointTypeCode	M	1
	NetworkAccessPointID	M	ZFP Server Machine Name
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4
Participating Object: Document Downloaded (1)	ParticipantObjectTypeCode	M	2
	ParticipantObjectTypeCodeRole	M	3
	ParticipantObjectIDTypeCode	M	EV(110180, DCM, "DocumentUniqueId")
	ParticipantObjectID	M	Document Unique ID
Participating Object: Patient Information for Document Downloaded (2)	ParticipantObjectTypeCode	M	1
	ParticipantObjectTypeCodeRole	M	1
	ParticipantObjectIDTypeCode	M	EV(2, DCM, "Patient Number")
	ParticipantObjectID	M	Patient Identifier and Affinity Domain values for document
	ParticipantObjectName	U	Patient Name

2.9.9 Emergency Override

This message describes any event for which the system reports a security alert.

TABLE 2.23 Audit Message for Emergency Override

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110113, DCM, "Security Alert")
	EventActionCode	M	Enumerated Value E = Execute
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
	EventTypeCode	M	EV (110127, DCM, "Emergency Override")
Active Participant: User performing override (1)	UserID	M	Logged in User Account ID
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110150, DCM, "Application")
	NetworkAccessPointTypeCode	M	1
	NetworkAccessPointID	M	ZFP Server Machine Name
Active Participant: Process executing override (1)	UserID	M	ZFP Server URL
	UserIsRequestor	M	True
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	U	2
	NetworkAccessPointID	U	ZFP Client Node IP Address
Participating Object:	ParticipantObjectTypeCode	M	2

Studies being transferred (1..n)	ParticipantObjectTypeCodeRole	M	13
	ParticipantObjectIDTypeCode	M	EV(12, DCM,"URI")
	ParticipantObjectID	M	Patient Identifier and Affinity Domain values for document
	ParticipantObjectName	U	Patient Name
	ParticipantObjectDetail	M	Type="Alert Description"; Value=<User Reason Comment>
	SOP Class	U	UIDs of SOP classes
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4

2.9.10 Instance Transferred

This message describes the event of the completion of transferring DICOM SOP Instances between two Application Entities. This message may only include information about a single patient.

TABLE 2.24 Audit Message for Instance Transferred

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110104, DCM, "DICOM Instances Transferred")
	EventActionCode	M	Enumerated Value C = Create
	EventDateTime	M	System Current Date
	EventOutcomeIndicator	M	0
Active Participant (1):	UserID	M	CPACS | AE Title (depending on where the study is coming from)
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	1
	NetworkAccessPointID	M	ZFP Server Machine Name
Active Participant (1):	UserID	M	AE Title (depending on where the study is transferred to)
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110152, DCM, "Destination")
Active Participant (1):	UserID	M	Logged in User Account ID
	UserIsRequestor	M	True
	RoleIDCode	M	EV (1, DCM, "Person")
	NetworkAccessPointTypeCode	M	2
	NetworkAccessPointID	M	ZFP Client Node / IP Address
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4
Participating Object: Document Downloaded (1..n)	ParticipantObjectTypeCode	M	2
	ParticipantObjectTypeCodeRole	M	3
	ParticipantObjectIDTypeCode	M	EV(110180, DCM, "Study Instance UID")
	ParticipantObjectID	M	<Study Instance UID>
	ParticipantObjectDescription	U	Contains Accession and SOPClasses
	SOPClass	U	SOPClass UIDs
	Accession	U	Accession Number
	NumberOfInstances	U	Number of instances per SOPClass
Participating Object: Patient Information for Document Downloaded (1)	ParticipantObjectTypeCode	M	1
	ParticipantObjectTypeCodeRole	M	1
	ParticipantObjectIDTypeCode	M	EV(2, DCM, "Patient Number")
	ParticipantObjectID	M	Patient Identifier
	ParticipantObjectName	U	Patient Name

2.9.11 Execute Document Workflow Task

This message describes the event of the completion of a document workflow task, e.g. update report state.

TABLE 2.25 Audit Message for Execute Document Workflow Task

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV ("Read", RAD, "Read Report"), EV ("Unread", RAD, "Unread Report")
	EventActionCode	M	Enumerated Value R = Read
	EventDateTime	M	System Current Date

	EventOutcomeIndicator	M	0
	EventTypeCode	M	Document Workflow
Active Participant (1):	UserID	M	ZFP Server URL
	UserIsRequestor	M	False
	RoleIDCode	M	EV (110150, DCM, "Application")
	NetworkAccessPointTypeCode	M	1
	NetworkAccessPointID	M	ZFP Server Machine Name
Active Participant (1):	UserID	M	Logged in User Account ID
	UserIsRequestor	M	True
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	U	**1**
	NetworkAccessPointID	U	ZFP Client Node IP Address
Audit Source Identification	Audit Source ID	U	ZFP AuditSourceId (Configurable)
	Code	U	4
Participating Object: Patient Information	ParticipantObjectTypeCode	M	1
	ParticipantObjectTypeCodeRole	M	1
	ParticipantObjectIDTypeCode	M	EV(2, DCM, “Patient Number”)
	ParticipantObjectID	M	Patient Identifier and Affinity Domain values for document
	ParticipantObjectName	U	Patient Name
Participating Object: Report Information	ParticipantObjectTypeCode	M	2
	ParticipantObjectTypeCodeRole	M	3
	ParticipantObjectIDTypeCode	M	EV(9, DCM, “Report Number”)
	ParticipantObjectID	M	Document Unique ID
	ParticipantObjectDetail	U	Type value = “Comments” and the Value of the attribute is the description for executing document workflow task. The element content is an xs:base64Binary encoding.

3. GRAYSCALE SOFTCOPY PRESENTATION STATE IOD IMPLEMENTATION

This section specifies the use of the DICOM Grayscale Softcopy Presentation State IOD to represent the information included in GSPSs produced by the Universal Viewer ZFP implementation. Corresponding attributes are conveyed using the module construct.

Universal Viewer ZFP can create Grayscale Presentation State SOP Instances when a user selects to export the internal presentation state of a study. One or more objects may be created to represent content of the internal presentation state. If more than one GSPS object is created, all of them are created with the same values of Presentation Label, Description, Author, Creation Date and Time.

The Presentation Label and Description are entered by the user at the time of the export of the presentation state. The Supported SOP classes for presentation state are specified in Section 3.5.

3.1 MAPPING OF DICOM ENTITIES

Universal Viewer ZFP maps DICOM Information Entities to local information entities in the product's database and user interface.

Table 3-1 Mapping of DICOM Entities to Local Entities

DICOM IE	Local Entity
Patient	Patient
Study	Study
Series	Series
Presentation State	Presentation State

3.2 IOD MODULE TABLE

The Grayscale Softcopy Presentation State Information Object Definition comprises the modules of the following table, plus Standard Extended and Private attributes. Standard Extended and Private attributes are described in Section 3.4.

Table 3-2 GSPS IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	3.3.1.1
	Clinical Trial Subject	Not Used	
Study	General Study	Used	3.3.2.1
	Patient Study	Not Used	
	Clinical Trial Study	Not Used	
Series	General Series	Used	3.3.3.1
	Clinical Trial Series	Not Used	
	Presentation Series	Used	3.3.3.2
Equipment	General Equipment	Used	3.3.4.1

Entity Name	Module Name	Usage	Reference
Presentation State	Presentation State Identification	Used	3.3.5.1
	Presentation State Relationship	Used	3.3.5.2
	Presentation State Shutter	Not Used	3.3.5.3
	Presentation State Mask	Not Used	
	Mask	Not Used	
	Display Shutter	Used Only if a Display Shutter is to be applied to referenced image(s).	3.3.5.4
	Bitmap Display Shutter	Not Used	
	Overlay Plane	Not used	
	Overlay Activation	Not used	
	Displayed Area	Used	3.3.5.5
	Graphic Annotation	Used when measurements or graphic/text labels are present	3.3.5.6
	Spatial Transformation	Used if rotation or flipping are to be applied to referenced image(s)	3.3.5.7
	Graphic Layer	Not Used	3.3.5.8
	Graphic Group	Not used	
	Modality LUT	Used if referenced image includes Modality LUT	3.3.5.9
	Softcopy VOI LUT	Used if a VOI LUT is to be applied to referenced image(s)	3.3.5.10
	Softcopy Presentation LUT	Used	3.3.5.11
	SOP Common	Used	3.3.5.12

3.3 INFORMATION MODULE DEFINITIONS

Please refer to DICOM Part 3 (Information Object Definitions) for a description of each of the entities, modules, and attributes contained within the GSPS Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are

obtained from when generating the instance. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions).

Note: Attributes not present in tables are not supported.

3.3.1 Patient Entity Modules

3.3.1.1 Patient Module

Table 3-3 PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	Taken from the images of the study
Patient ID	(0010,0020)	2	Taken from images of the study
Issuer of Patient ID	(0010,0021)	3	Taken from images of the study
Patient's Birth Date	(0010,0030)	2	Taken from images of the study
Patient's Sex	(0010,0040)	2	Taken from images of the study
Referenced Patient Sequence	(0008,1120)	3	Not Used
Patient's Birth Time	(0010,0032)	3	Not Used
Other Patient IDs	(0010,1000)	3	Not Used
Other Patient IDs Sequence	(0010,1002)	3	Not Used
Other Patient Names	(0010,1001)	3	Not Used
Ethnic Group	(0010,2160)	3	Not Used
Patient Comments	(0010,4000)	3	Not Used

3.3.2 Study Entity Modules

3.3.2.1 General Study Module

Table 3-4 GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Taken from images of the study
Study Date	(0008,0020)	2	Taken from Images of the study
Study Time	(0008,0030)	2	Taken from Images of the study
Referring Physician's Name	(0008,0090)	2	Not Used
Referring Physician Identification Sequence	(0008,0096)	3	Not Used
Study ID	(0020,0010)	2	Not Used
Accession Number	(0008,0050)	2	Not Used
Study Description	(0008,1030)	3	Taken from Images of the Study

3.3.3 Series Entity Modules

3.3.3.1 General Series Module

Table 3-5 GENERAL SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	Value = PR

Attribute Name	Tag	Type	Attribute Description
Series Instance UID	(0020,000E)	1	New value is assigned for the set of GSPS objects created at the same time
Series Number	(0020,0011)	2	Always 1
Laterality	(0020,0060)	2C	Not Used
Series Date	(0008,0021)	3	Date of series creation
Series Time	(0008,0031)	3	Time of series creation

3.3.3.2 Presentation Series Module

Table 3-6 PRESENTATION SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Modality	(0008,0060)	1	Value = PR

3.3.4 Equipment Entity Modules

3.3.4.1 General Equipment Module

Table 3-7 GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	Value = GE Healthcare IT Radiology
Institution Name	(0008,0080)	3	Not Used
Institution Address	(0008,0081)	3	Not Used
Station Name	(0008,1010)	3	Value = name of workstation computer
Institutional Department Name	(0008,1040)	3	Not Used
Manufacturer's Model Name	(0008,1090)	3	Value = Universal Viewer ZFP
Device Serial Number	(0018,1000)	3	Not Used
Software Versions	(0018,1020)	3	Value = version of Universal Viewer ZFP
Gantry ID	(0018,1008)	3	Not Used
Spatial Resolution	(0018,1050)	3	Not Used
Date of Last Calibration	(0018,1200)	3	Not Used
Time of Last Calibration	(0018,1201)	3	Not Used
Pixel Padding Value	(0028,0120)	1C	Not Used

3.3.5 Presentation State Entity Modules

3.3.5.1 Presentation State Identification Module

Table 3-8 PRESENTATION STATE IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Presentation Creation Date	(0070,0082)	1	Date of instance creation
Presentation Creation Time	(0070,0083)	1	Time of instance creation
Instance Number	(0020,0013)	1	Always 1

Content Label	(0070,0080)	1	Entered by user
Content Description	(0070,0081)	2	Entered by user or else Empty
Content Creator's Name	(0070,0084)	2	Name of the user who created Presentation State
Content Creator's Identification Code Sequence	(0070,0086)	3	Not Used

3.3.5.2 Presentation State Relationship Module

Table 3-9 PRESENTATION STATE RELATIONSHIP MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Referenced Series Sequence	(0008,1115)	1	
>Series Instance UID	(0020,000E)	1	
>Referenced Image Sequence	(0008,1140)	1	
>>Referenced SOP Class UID	(0008,1150)	1	
>>Referenced SOP Instance UID	(0008,1155)	1	
>>Referenced Frame Number	(0008,1160)	1C	Used if Presentation State related to the frame of multi-frame image
>>Referenced Segment Number	(0062,000B)	1C	Not Used

3.3.5.3 Presentation State Shutter Module

Table 3-10 PRESENTATION STATE SHUTTER MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Shutter Presentation Value	(0018,1622)	1C	Not Used
Shutter Presentation Color CIELab Value	(0018,1624)	1C	Not Used

3.3.5.4 Display Shutter Module

Table 3-11 DISPLAY SHUTTER MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Shutter Shape	(0018,1600)	1	Enumerated Values used: CIRCULAR RECTANGULAR
Shutter Left Vertical Edge	(0018,1602)	1C	Required if Shutter Shape (0018,1600) is RECTANGULAR
Shutter Right Vertical Edge	(0018,1604)	1C	Required if Shutter Shape (0018,1600) is RECTANGULAR
Shutter Upper Horizontal Edge	(0018,1606)	1C	Required if Shutter Shape (0018,1600) is RECTANGULAR
Shutter Lower Horizontal Edge	(0018,1608)	1C	Required if Shutter Shape (0018,1600) is RECTANGULAR
Center of Circular Shutter	(0018,1610)	1C	Required if Shutter Shape (0018,1600) is CIRCULAR
Radius of Circular Shutter	(0018,1612)	1C	Required if Shutter Shape (0018,1600) is CIRCULAR
Vertices of the Polygonal Shutter	(0018,1620)	1C	Not used

3.3.5.5 Displayed Area Module

Table 3-12 DISPLAYED AREA MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Displayed Area Selection Sequence	(0070,005A)	1	
>Referenced Image Sequence	(0008,1140)	1C	Used. Sequence of Repeating Items where each Item provides reference to a selected set of Image SOP Class/SOP Instance pairs that are defined in the Presentation State Module.
>>Referenced SOP Class UID	(0008,1150)	1	
>>Referenced SOP Instance UID	(0008,1155)	1	
>>Referenced Frame Number	(0008,1160)	1C	Used if applied to subset of frames of multi-frame image
>>Referenced Segment Number	(0062,000B)	1C	Not Used
>Displayed Area Top Left Hand Corner	(0070,0052)	1	
>Displayed Area Bottom Right Hand Corner	(0070,0053)	1	
>Presentation Size Mode	(0070,0100)	1	Enumerated Values used: SCALE TO FIT
>Presentation Pixel Spacing	(0070,0101)	1C	Used
>Presentation Pixel Aspect Ratio	(0070,0102)	1C	Used
>Presentation Pixel Magnification Ratio	(0070,0103)	1C	Not used

3.3.5.6 Graphic Annotation Module

Table 3-13 GRAPHIC ANNOTATION MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Graphic Annotation Sequence	(0070,0001)	1	
>Referenced Image Sequence	(0008,1140)	1C	Used
>>Referenced SOP Class UID	(0008,1150)	1	
>>Referenced SOP Instance UID	(0008,1155)	1	
>>Referenced Frame Number	(0008,1160)	1C	Used if annotation is applied to subset of frames of multi-frame image
>>Referenced Segment Number	(0062,000B)	1C	Not Used
>Graphic Layer	(0070,0002)	1	
>Text Object Sequence	(0070,0008)	1C	
>>Bounding Box Annotation Units	(0070,0003)	1C	Enumerated Values used: PIXEL
>>Anchor Point Annotation Units	(0070,0004)	1C	Enumerated Values used:

Attribute Name	Tag	Type	Use
			PIXEL
>>Unformatted Text Value	(0070,0006)	1	
>>Bounding Box Top Left Hand Corner	(0070,0010)	1C	Used
>>Bounding Box Bottom Right Hand Corner	(0070,0011)	1C	Used
>>Bounding Box Text Horizontal Justification	(0070,0012)	1C	Enumerated Values used: LEFT
>>Anchor Point	(0070,0014)	1C	Used
>>Anchor Point Visibility	(0070,0015)	1C	Not Used
>Graphic Object Sequence	(0070,0009)	1C	Used
>>Graphic Annotation Units	(0070,0005)	1	Enumerated Values used: PIXEL
>>Graphic Dimensions	(0070,0020)	1	
>>Number of Graphic Points	(0070,0021)	1	
>> Graphic Data	(0070,0022)	1	
>>Graphic Type	(0070,0023)	1	Enumerated Values used: POLYLINE INTERPOLATED ELLIPSE
>>Graphic Filled	(0070,0024)	1C	Enumerated Values used: N = no
>Compound Graphic Sequence	(0070,0209)	3	Used
>>Graphic Dimensions	(0070,0020)	1	
>>Number of Graphic Points	(0070,0021)	1	
>> Graphic Data	(0070,0022)	1	
>>Compound Graphic Instance ID	(0070,0226)	1	
>>Compound Graphic Units	(0070,0282)	1	Enumerated Values used: PIXEL
>>Compound Graphic Type	(0070,0294)	1	Enumerated Values used: LINE* ELLIPSE COBB_ANGLE* FREEHAND* ARROW MULTILINES* RECTANGLE

* Private graphic types.

3.3.5.7 Spatial Transformation Module

Table 3-14 SPATIAL TRANSFORMATION MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Image Rotation	(0070,0042)	1	Enumerated Values used: 0 90 180 270
Image Horizontal Flip	(0070,0041)	1	Enumerated Values used: Y = yes N = no

3.3.5.8 Graphic Layer Module

Table 3-15 GRAPHIC LAYER MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Graphic Layer Sequence	(0070,0060)	1	Not Used
>Graphic Layer	(0070,0002)	1	Not Used
>Graphic Layer Order	(0070,0062)	1	Not Used
>Graphic Layer Recommended Display Grayscale Value	(0070,0066)	3	Not Used
>Graphic Layer Recommended Display RGB Value	(0070,0067)	3	Not Used
>Graphic Layer Recommended Display CIELab Value	(0070,0401)	3	Not Used
>Graphic Layer Description	(0070,0068)	3	Not Used

3.3.5.9 Modality LUT Module

Table 3-16 MODALITY LUT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality LUT Sequence	(0028,3000)	1C	Copied from the referenced image, if present
>LUT Descriptor	(0028,3002)	1	
>LUT Explanation	(0028,3003)	3	
>Modality LUT Type	(0028,3004)	1	Not Used
>LUT Data	(0028,3006)	1	
Rescale Slope	(0028,1052)	1C	Copied from the referenced image, if present
Rescale Intercept	(0028,1053)	1C	Used if Modality LUT Sequence (0028,3000) is not present. Copied from the referenced image, if present
Rescale Type	(0028,1054)	1C	Copied from the referenced image, if present

3.3.5.10 Softcopy VOI LUT Module

Table 3-17 SOFTCOPY VOI LUT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Softcopy VOI LUT Sequence	(0028,3110)	1	Defines a sequence of VOI LUTs or Window Centers and Widths and to which images and frames they apply
>Referenced Image Sequence	(0008,1140)	1C	Used
>>Referenced SOP Class UID	(0008,1150)	1	
>>Referenced SOP Instance UID	(0008,1155)	1	
>>Referenced Frame Number	(0008,1160)	1C	Used if referencing a frame in multi-frame image
>VOI LUT Sequence	(0028,3010)	1C	Used if applied to the referenced image
>>LUT Descriptor	(0028,3002)	1	
>>LUT Explanation	(0028,3003)	3	
>>LUT Data	(0028,3006)	1	
>Window Center	(0028,1050)	1C	A single Value is provided
>Window Width	(0028,1051)	1C	A single Value is provided
>Window Center & Width Explanation	(0028,1055)	3	Not Used
>VOI LUT Function	(0028,1056)	3	Not Used

3.3.5.11 Softcopy Presentation LUT Module

Table 3-18 SOFTCOPY PRESENTATION LUT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Presentation LUT Sequence	(2050,0010)	1C	Not Used
>LUT Descriptor	(0028,3002)	1	
>LUT Explanation	(0028,3003)	3	
>LUT Data	(0028,3006)	1	
Presentation LUT Shape	(2050,0020)	1C	Enumerated Values used: IDENTITY INVERSE

3.3.5.12 SOP Common Module

Table 3-19 SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	Generated using the internal computer clock
Specific Character Set	(0008,0005)	1C	Set according to the system configuration. Defined terms shown in Section 2.4
Instance Creation Date	(0008,0012)	3	Used
Instance Creation Time	(0008,0013)	3	Used

Instance Creator UID	(0008,0014)	3	Not Used

Centricity Universal Viewer Zero Footprint v6.0-SP11.5 onwards, following DICOM tags are also added to the saved presentation state DICOM instance:

Table 3-20 SCHEDULED STEP ATTRIBUTE SEQUENCE

Scheduled Step Attribute Sequence	(0040,0270)	3	Used
>Study Instance UID	(0020,000D)	1	Examination study instance UID
>Referenced SOP Class UID	(0008,1150)	1	SOP class UID taken from image
>Referenced SOP Instance UID	(0008,1155)	1	Component study instance UID

3.4 PRIVATE DATA ATTRIBUTES

The Product supports the Standard and Private Attributes defined in the following sections in Standard Extended GSPS SOP Instances as Type 3 data elements.

3.4.1 Private Group GEIIS_IW

Private Group GEIIS_IW is modeled as part of the Presentation State Information Entity.

Table 3-20 Private Group GEIIS_IW

Attribute Name	Tag	VR	VM	Use
Private Creator Identification	(0075,00xx)	LO	1	GEIIS_IW
Private Group ID	(0075,xx10)	IS	1	

3.4.2 Private Group GEIIS_RA1000

Private Group GEIIS_RA1000 is modeled as part of the Presentation State Information Entity.

Table 3-21 Private Group GEIIS_RA1000

Attribute Name	Tag	VR	VM	Use
Private Creator Identification	(0071,00xx)	LO	1	GEIIS_RA1000
Private GSPS Annotation Model Type	(0071,xx01)	CS	1	Used in Graphic Annotation Module
Private Creator Identification	(0019,00xx)	LO	1	GEIIS_RA1000
Private Shutter Type	(0019,xx01)	CS	1	The actual shutter shape if it differs from the shape specified in the public Shutter Shape tag (0018,1600). Possible values: ELLIPTICAL Used in Display shutter module.
Private Creator Identification	(0029,00xx)	LO	1	GEIIS_RA1000
Original LUT Descriptor	(0029,xx20)	US	3	Copy of original LUT Descriptor from DICOM tag (0028,3002).

				Used in Softcopy VOI LUT Module
Original LUT Data	(0029,xx22)	US	N	LUT Data before adjustment. Copy of original LUT Data from DICOM tag (0028,3006). Used in Softcopy VOI LUT Module

3.4.3 Private Group Applicare/RadWorks/Version 6.0

Private Group Applicare/RadWorks/Version 6.0 is modeled as part of the Presentation State Information Entity. It is used only during reading the GSPS.

Table 3-222 Private Group Applicare/RadWorks/Version 6.0

Attribute Name	Tag	VR	VM	Use
Private Creator Identification	(4105,00xx)	LO	1	Applicare/RadWorks/Version 6.0
Private GSPS Annotation Type	(4105,xx01)	CS	1	Used in reading
Private Group ID	(4105,xx10)	IS	1	Used in reading
Private Measurement Text	(4105,xx10)	CS	1	Used in reading

3.5 SUPPORTED SOP CLASSES WITH GRAYSCALE SOFTCOPY PRESENTATION STATE

The Universal Viewer ZFP supports creation and read of Grayscale Softcopy Presentation State Storage SOP Instances for the following Image Storage SOP Classes:

Table 3-233 SOP classes supported with Grayscale Softcopy Presentation State Storage SOP Instances

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2

SOP Class Name	SOP Class UID
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
NM Image (Retired)	1.2.840.10008.5.1.4.1.1.5
RT Image	1.2.840.10008.5.1.4.1.1.481.1